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POTAMORRHAPHIS PETERSI, A NEW SPECIES OF FRESHWATER NEEDLEFISH (BELONIDAE) FROM THE UPPER ORINOCO AND RIO NEGRO

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While reviewing the South American freshwater needlefish genus *Potamorrhaphis*, an undescribed species was found from the upper tributaries of the Orinoco in Venezuela and Colombia and the upper Rio Negro in Brazil. Because completion of the generic review has been delayed, I have decided to describe the new species separately. It is herein named in honor of the late Dr. James A. Peters, who was best known as an authority on Neotropical amphibians and reptiles. He directly aided my studies of the South American freshwater needlefishes *Potamorrhaphis* and *Pseudotylosurus*, and I take great pleasure in naming this species after him.

Study materials are in the collections of the Academy of Natural Sciences, Philadelphia (ANSP); the American Museum of Natural History (AMNH); California Academy of Sciences, San Francisco (CAS and SU); Muséum National d'Histoire Naturelle, Paris (MNHN); INDERENA, Bogotá; Museo de Biología, Universidad Central de Venezuela, Caracas (MBUCV); and the National Museum of Natural History (USNM). This paper is one in a series on the systematics of the Synentognathi; see Collette (1966) on *Belonion* and Collette (in press) on *Pseudotylosurus* for studies on the other two genera of South American freshwater needlefishes.

Discovery of a second species of *Potamorrhaphis* and sepa-

TABLE 1. Vertebral and fin-ray counts of *Potamorrhaphis petersi* and three populations of *P. guianensis*.

	Total vertebrae																		
	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	x̄	N
P. petersi																				
Upper Orinoco													2	1	–	–	2	1	82.3	6
Upper R. Negro-Casiquiare													1	1					80.5	2
Río Tomo										1									77	1
Total										1	–	–	3	2	–	–	2	1	81.3	9
P. guianensis																				
Lower Orinoco				5	7	7	2	1											72.4	22
Guianas		2	5	9	19	22	4	2											72.2	63
Lower Amazon	1	1	4	7	5	5	6	1	4	1									72.5	35
Total	1	3	9	21	31	34	12	4	4	1									72.3	120

	Caudal vertebrae																
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	x̄	N
P. petersi																	
Upper Orinoco											3	–	–	1	2	41.8	6
Upper R. Negro-Casiquiare											1	–	1			41.0	2
Río Tomo									1							38	1
Total									1	–	4	–	1	1	2	41.2	9
P. guianensis																	
Lower Orinoco			6	10	5	1										33.0	22
Guianas		3	4	20	27	7	2									33.6	63
Lower Amazon	1	1	2	10	9	6	2	4								34.0	35
Total	1	4	12	40	41	14	4	4								33.6	120

TABLE 1. Continued.

	Dorsal-fin rays															
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	$\bar{x}$	N
P. petersi																	
Upper Orinoco										1	2	–	1	1	1	40.3	6
Upper R. Negro-Casiquiare										2						38.0	2
Río Tomo									1							37	1
Total									1	3	2	–	1	1	1	39.4	9
P. guianensis																	
Lower Orinoco		4	4	14	2											31.6	24
Guianas		1	13	48	31	22	4									32.6	119
Lower Amazon	1	7	8	26	17	9	9									32.5	77
Total	1	12	25	88	50	31	13									32.5	220

	Anal-fin rays															
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	$\bar{x}$	N
P. petersi																	
Upper Orinoco										2	1	–	–	2	1	36.3	6
Upper R. Negro-Casiquiare										2						34.0	2
Río Tomo								1								32	1
Total								1	–	4	1	–	–	2	1	35.3	9
P. guianensis																	
Lower Orinoco		2	5	14	2	1	1									27.8	25
Guianas		1	22	56	27	11	1									28.2	118
Lower Amazon	2	8	19	31	9	7	1									27.8	77
Total	2	11	46	101	38	19	3									28.1	220

TABLE 2. Measurements (as percent of body length) of *Potamorrhaphis guianensis* from the lower Orinoco and *P. petersi*.

Character	*P. guianensis*				*P. petersi*			
	Range		$\bar{x}$	N	Range		$\bar{x}$	N
Body length (mm)	87.8	119	101.9	23	92.7	162	120.9	9
Head length	55.2	59.2	56.91	11	47.8	55.9	51.18	4
Snout length	37.7	42.0	40.52	11	33.9	41.2	37.18	4
Postorbit length	10.7	12.5	11.37	23	9.4	11.1	10.07	9
Preopercle length	5.5	6.9	6.17	23	5.2	5.9	5.47	9
Orbit length	4.2	5.1	4.75	23	3.9	4.6	4.24	9
Interorbit width	4.8	5.6	5.17	23	4.2	4.9	4.52	9
Head depth	5.3	6.7	6.25	23	4.9	6.0	5.54	9
Head width	5.1	5.9	5.45	23	4.7	6.3	5.40	9
Pectoral-fin length	10.3	13.2	11.86	18	9.7	11.8	10.61	9
Pelvic-fin length	6.1	7.9	7.20	23	6.2	7.3	6.78	9
Pectoral fin to pelvin fin	47.4	52.0	49.44	23	43.5	46.8	44.94	9
Pelvic fin to caudal-fin base	46.0	51.4	48.97	23	51.6	54.2	53.18	9

ration (Collette, in press) of *Pseudotylosurus microps* (Günther) from *Ps. angusticeps* (Günther) raises the total number of species of freshwater synentognaths known from South America east of the Andes to seven. As previously noted (Collette, 1966), the other three include two neotenic needlefishes *Belonion dibranchodon* Collette (described from the same Río Atabapo locality as three paratypes of *P. petersi*) and *B. apodion* Collette plus the halfbeak *Hyporhamphus brederi* (Fernández-Yépez).

Potamorrhaphis petersi, new species

Figures 1–3

Diagnosis: A species of the genus *Potamorrhaphis* that differs from the other nominal species of the genus, *P. guianensis* (Schomburgk) and *P. eigenmanni* Miranda Ribeiro, primarily in having the posterior portion of the body greatly elongated. This is best reflected in the higher counts (Table 1): greater total number of vertebrae (77–85 vs. 64–77); caudal vertebrae (38–44 vs. 28–37); dorsal-fin rays (37–43 vs. 27–36); and anal-fin rays (32–39 vs. 24–31). Predorsal scales are more numerous than in the Orinoco population of *P. guianensis* (110–141, $\bar{x}$ 128 vs. 97–112, $\bar{x}$ 102).

Morphometrically (Table 2), this difference is shown by the distance

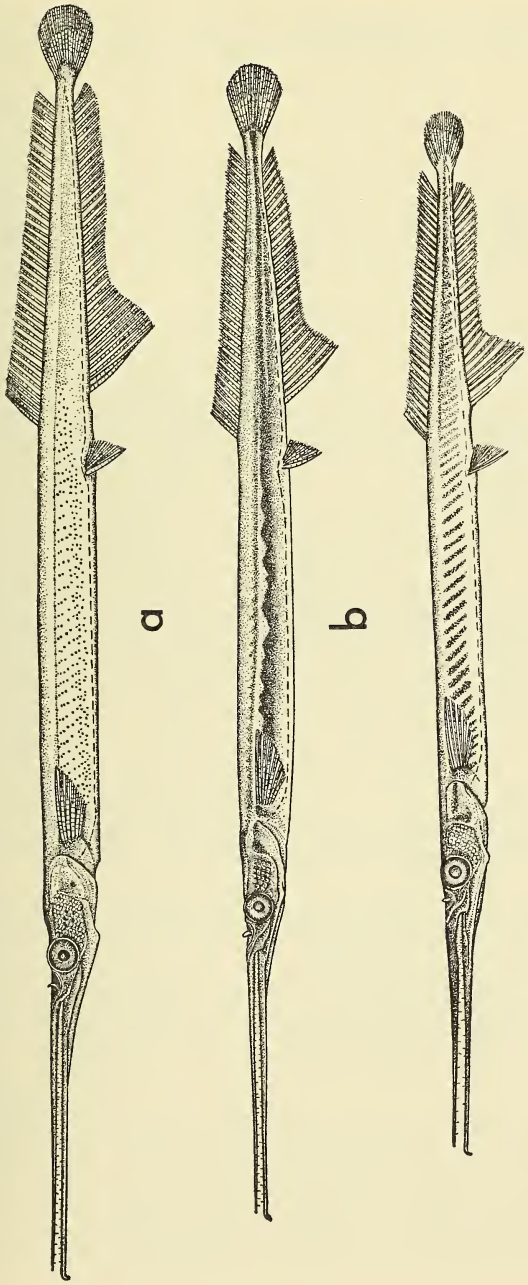

FIG. 1. a. *Potamorrhaphis petersi*, paratype, AMNH 9619, 134 mm body length, near Mt. Duida, upper Orinoco, Venezuela. b. *P. guianensis*, ANSP 116533, 119 mm, Rio Meta, Colombia. c. *P. guianensis*, USNM 179527, 108 mm, Rio Urubu, Lower Amazon, Brazil.

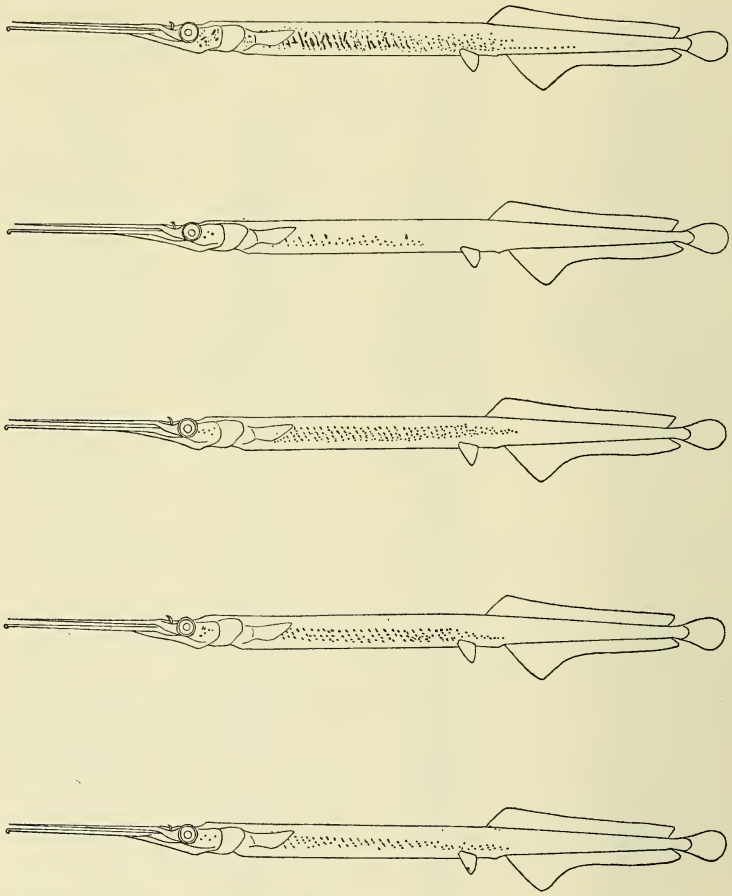

Fig. 2. Diagrammatic representation of pigment patterns of five specimens of *Potamorrhaphis petersi*. From top to bottom: USNM 210546, holotype, 162 mm BL, junction Río Guaviare and R. Inírida; USNM 210547, paratype, 137 mm, same data; AMNH 9619, paratype, 133 mm, upper Orinoco; MBUCV-V-6132, paratype, 124 mm, Río Casiquiare; and INDERENA G.A-P-0066, 111 mm BL, Río Tomo.

from the pelvic-fin origin to the caudal-fin base (P_2–C) being much greater than the distance from the pectoral-fin origin to the pelvic-fin origin (P_1–P_2) in *P. petersi* (P_2–C 51.6–54.2% vs. P_1–P_2 43.5–46.8% body length). These distances are about equal in *P. guianensis* from the lower Orinoco (P_2–C 46.0–51.4% vs. P_1–P_2 47.4–52.0% body length). Increasing the P_2–C distance in *P. petersi* also increases the body length

FIG. 3. Distribution of *Potamorrhaphis petersi* (stars) and northern populations of *P. guianensis* (dots).

thereby decreasing other body proportions. The type-series of *P. petersi* is completely separated from the Orinoco population of *P. guianensis* by having a smaller P_1–P_2 distance and is nearly completely separated in having a narrower interorbital distance and a shorter head (Table 2). Other proportions are also smaller but overlap with the Orinoco population of *P. guianensis.*

Potamorrhaphis petersi is also distinct in its pigment pattern. The deeper lying brown pigment that forms bars (Fig. 1c) or a continuous lateral band (Fig. 1b) in *P. guianensis* is absent and replaced by scattered large black melanophores that appear to be more superficial. These melanophores vary in number, size and position from specimen to specimen (Fig. 2) and from side to side in a single specimen.

Types: Holotype—USNM 210546, 162 mm body length, Colombia, Laguna Coco northeast of Puerto Inírida, pool near junction of Río Guaviare and Río Inírida, 17 January 1972, P. Cala. Paratypes: USNM 210547 (1: 137), same data as holotype. AMNH 9619 (1: 133), Venezuela, Caño Pescado, about 8 km north of Esmeralda near Mt. Duida, 9 March 1929, G. H. Tate. MNHN 87-655-6 (2: 97.5–123), and USNM 210861 (1: 108), Venezuela, Amazonas, Río Atabapo at San Fernando de Atabapo, October 1886; J. Chaffanjon. MBUCV-V-6132 (1: 124), Venezuela, Amazonas, Caño Beripamoni, tributary of Río Casiquiare, 29 January 1969, F. Mago L., J. Moscó, A. Machado. CAS 27587 (1: 92.7), Brazil, Rio Negro, São Gabriel rapids, above Camanaos, 1 February 1925, C. Ternetz.

Other specimen examined: INDERENA G.A-P-0066 (1: 111), Colombia, Río Tomo near entrance into Orinoco.

Comparative material: Only the data on Orinoco *Potamorrhaphis guianensis* is presented here; extensive material from the other parts of the range will be reported on in a subsequent generic review. Seven series containing a total of 24 specimens (62.7–113 mm body length) were taken in the lower Orinoco in Caño Quiribana at Caicara by C. Ternetz in April and May, 1925: SU 52684, SU 52683, CAS 28322, SU 52686, CAS 28323, SU 58818, USNM 209303. One specimen was recently collected in a western tributary of the Orinoco: ANSP 116533; 119 mm; Río Meta, Caño Emma at Finca El Viente south of Matuzal; 4°08′ N, 72°39′ W, 18 March 1973, J. E. Böhlke, W. Saul, and W. Smith-Vaniz.

Discussion: Discovery of *P. petersi* adds another species to the list of fishes common to the upper Orinoco, upper Rio Negro, and the connecting Río Casiquiare (Mago Leccia, 1971). *Potamorrhaphis* is probably derived from an inshore marine needlefish similar to *Strongylura* and has secondarily developed a larger number of caudal vertebrae and dorsal- and anal-fin rays (Collette, 1966: 21). In its even higher counts, *P. petersi* seems to be a specialized derivative of the wide-spread *P. guianensis.* Additional collecting is needed in the upper Orinoco, Río Tomo to the Río Meta and in the upper Rio Negro to ascertain the

distributional limits of *P. petersi* and to determine if it is sympatric with *P. guianensis* in the Orinoco or Amazon.

The INDERENA specimen from the Río Tomo has the lowest counts of vertebrae and dorsal- and anal-fin rays of the small series of *P. petersi*. It also has traces of the usual *P. guianensis* pigment pattern underlying the large scattered melanophores characteristic of *P. petersi*. This specimen is, therefore, not designated a paratype because of these hints of possible intergradation with downstream populations of *P. guianensis*. However, the recently collected ANSP specimen of *P. guianensis* from the Río Meta agrees well with the 24 specimens from Caicara on the lower Orinoco.

Additional information about four collections of *P. petersi* is available from the following references: Chaffanjon (1889), for the Río Atabapo specimens; La Monte (1929), for the AMNH specimen from near Mt. Duida; Böhlke (1953), for Ternetz material from the upper Orinoco and Rio Negro; and Mago Leccia (1971), for the Casiquiare specimen.

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